

Surface Inversions, Atmospheric Stability, and Spray Drift

Surface Temperature Inversions:

- Are very common
- Are easy to recognize
- Affect the dispersal of very small spray droplets suspended in the air
- Do not increase the amount of off-site movement
- Can increase the potential for offsite affects & the distance at which affects can be observed

Atmospheric Stability

- Inversions cause STABLE atmospheric conditions
- The concept of atmospheric stability helps understand how inversions affect drift
- Close to the ground, atmospheric stability changes regularly between STABLE, NEUTRAL, & UNSTABLE

55° F

60° F

65° F

70° F

75° F

80° F

The large scale trend in the atmosphere is that temperature decreases with height

55° F

60° F

65° F

70° F

75° F

80° F

Where there is a decrease in temperature with height greater than the adiabatic rate the atmosphere is UNSTABLE

55° F

60° F

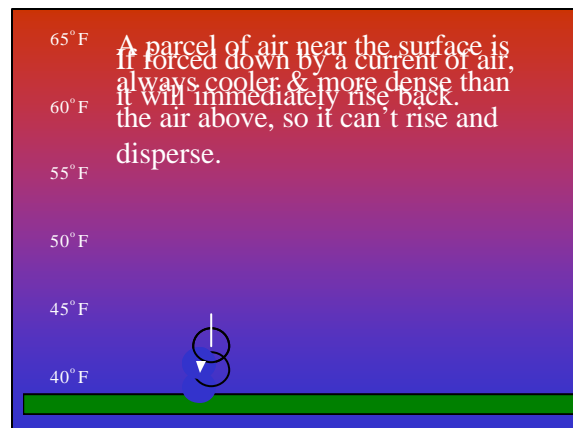
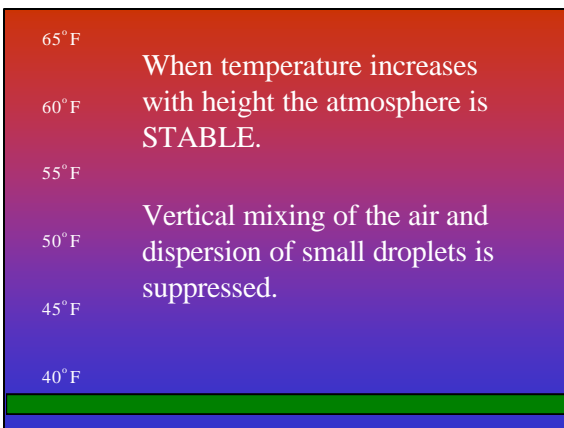
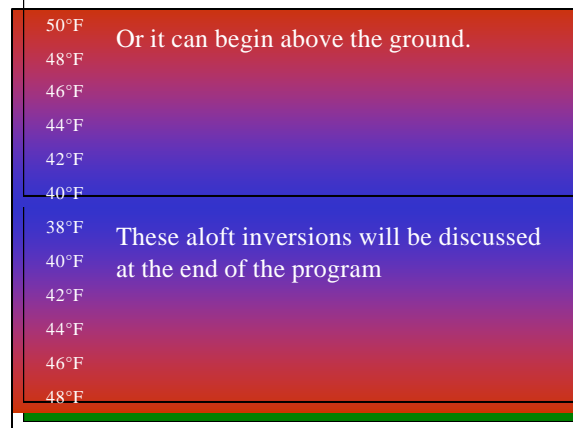
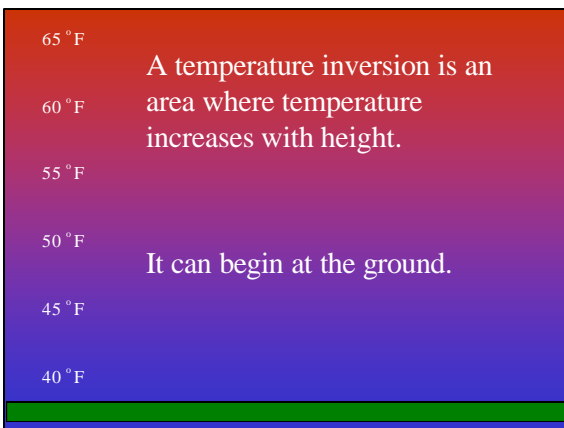
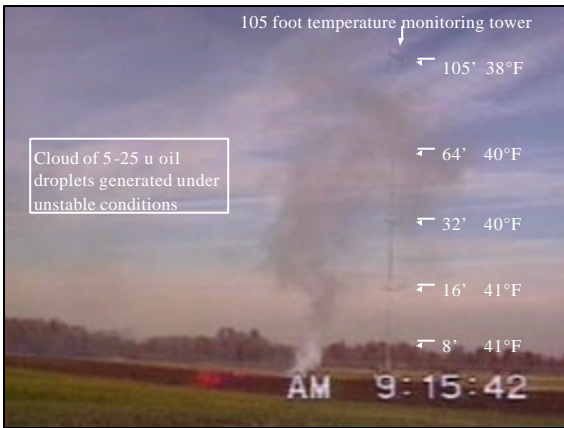
65° F

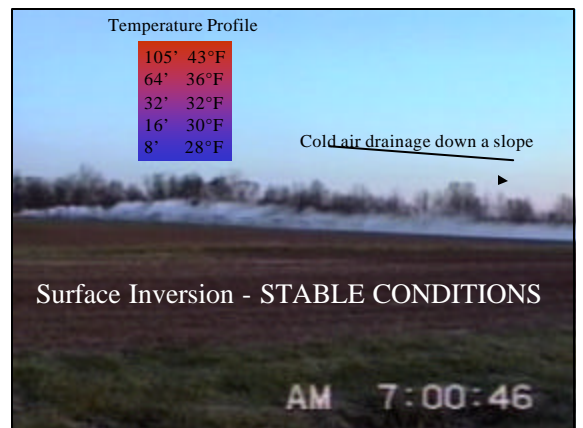
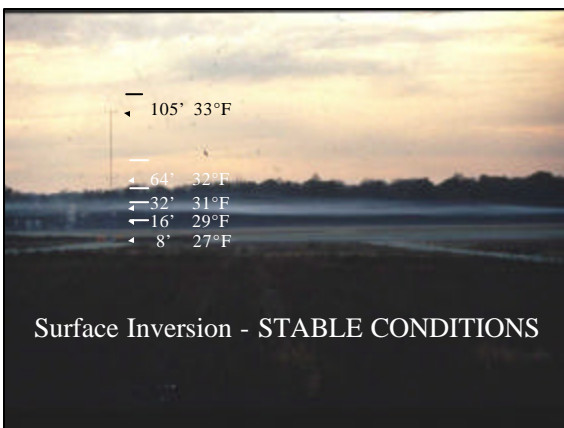
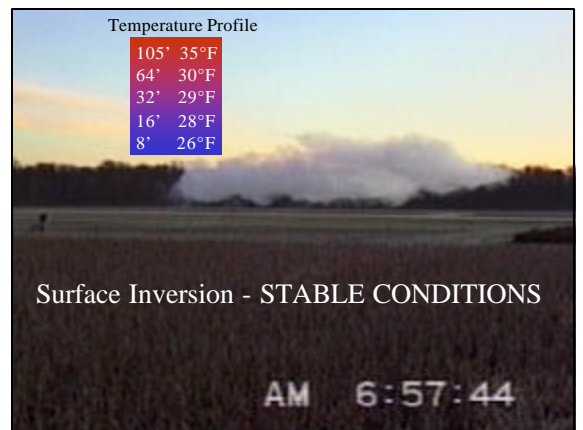
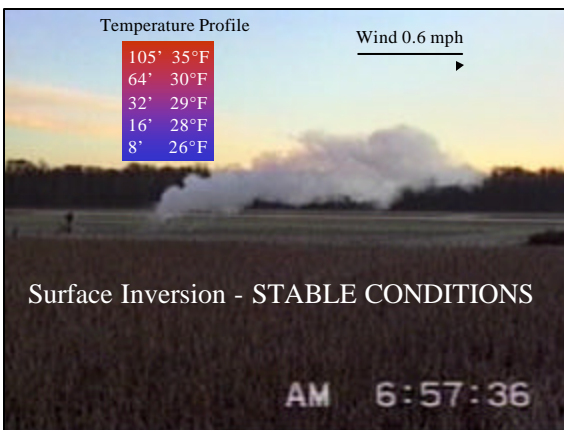
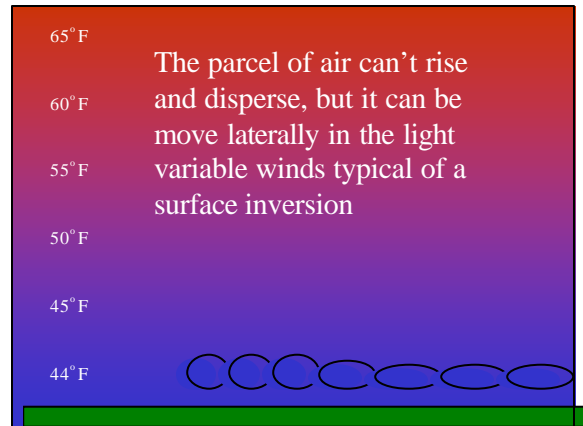
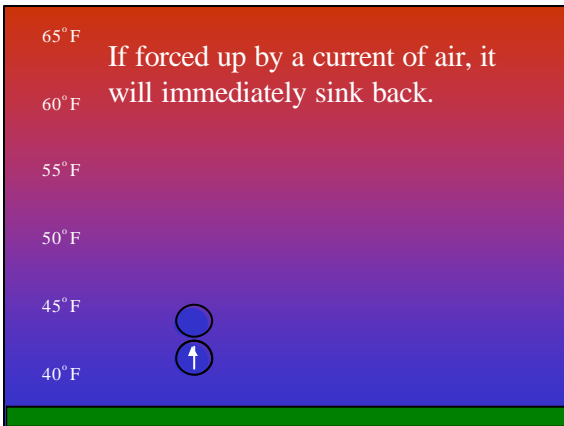
70° F

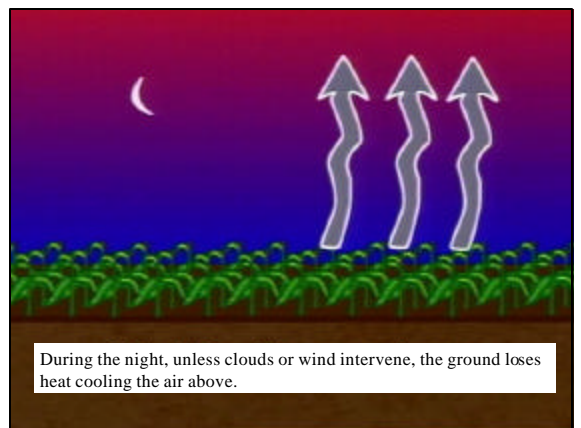
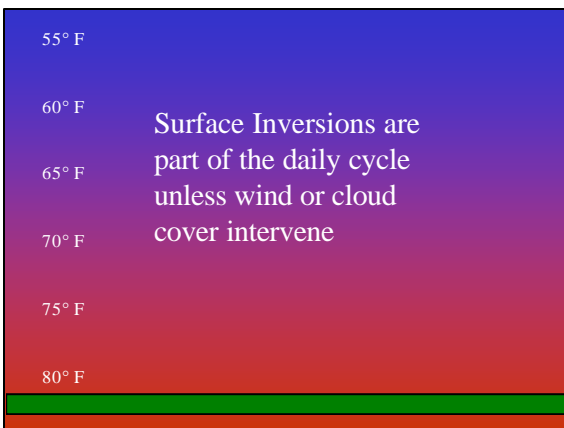
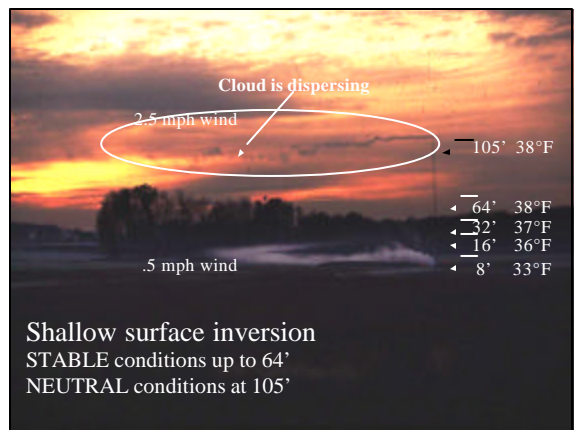
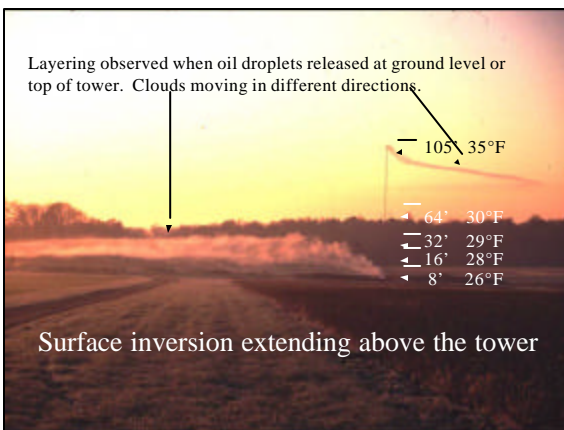
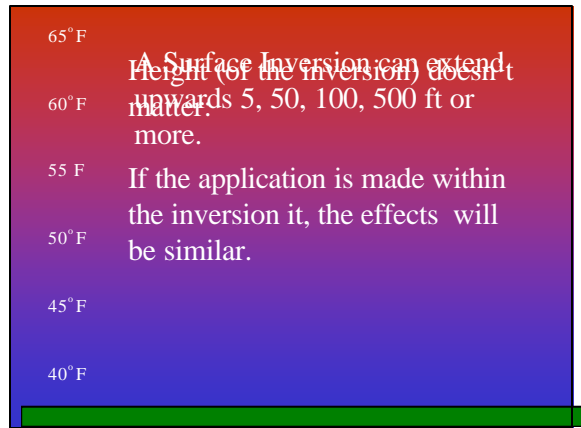
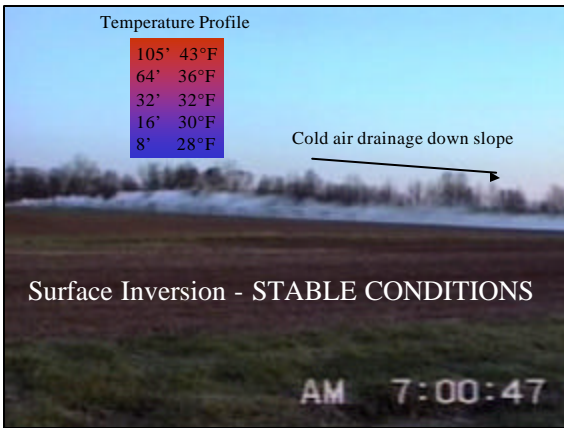
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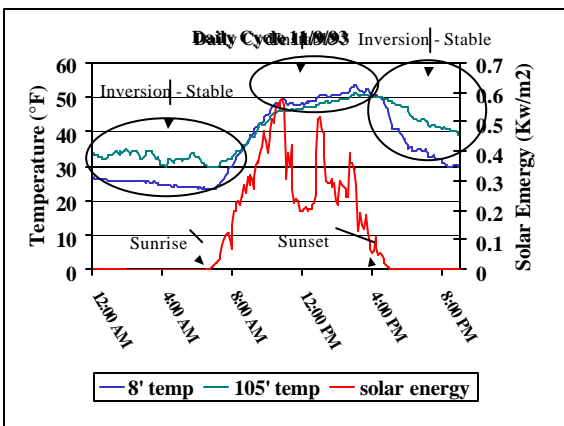
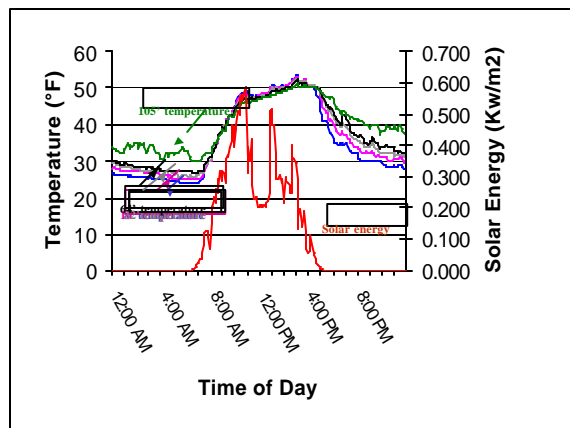
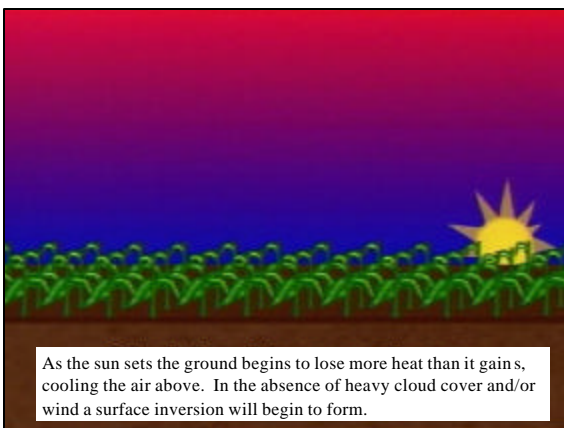
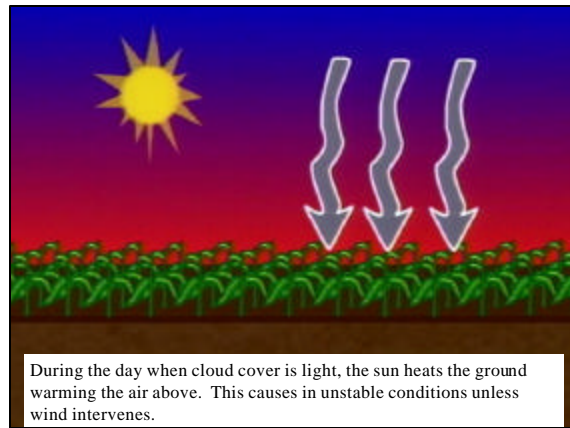
80° F

Droplets or particles suspended in the air will be dispersed/diluted. UNSTABLE air parcels near the surface will rise and expand because they are warmer & less dense than the air above



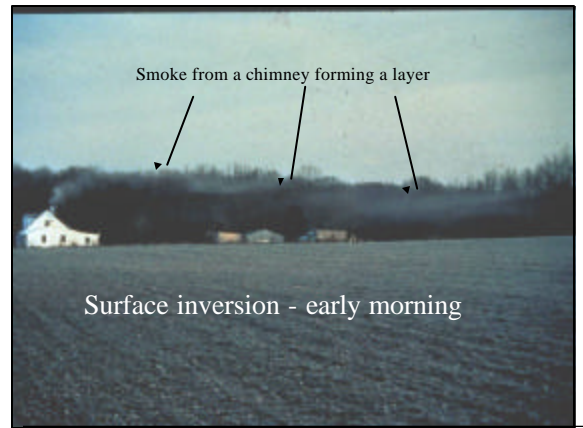
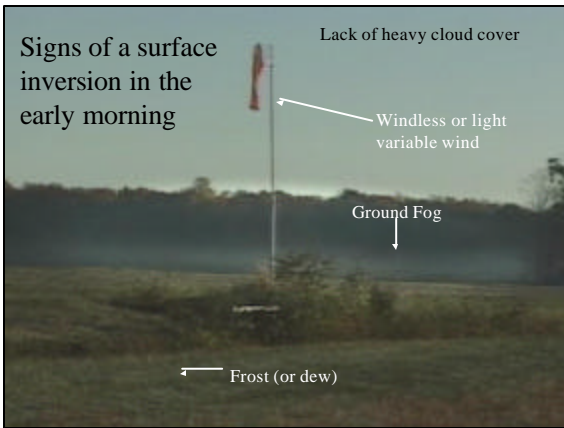






How to recognize a surface inversion

- Sunset to just after sunrise
- Windless to low wind conditions (<2-3 mph)
- Clear to partly cloudy skies
- Ground fog (if sufficient humidity exists)
- Dust hanging over a roadway
- Smoke from a chimney forming a layer
- Dew or frost (if sufficient humidity exists)



How to recognize the potential for a surface inversion

- Sun is getting low in the sky
- Wind is becoming light and variable
- Clear to partly cloudy skies

Surface Inversions don't:

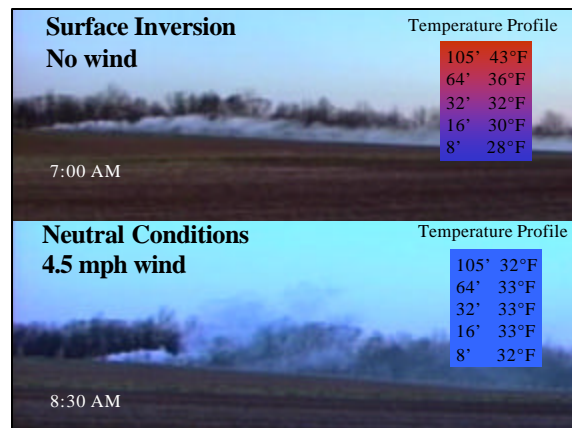
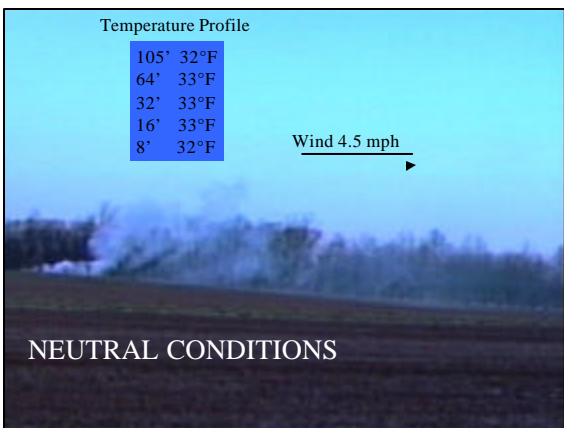
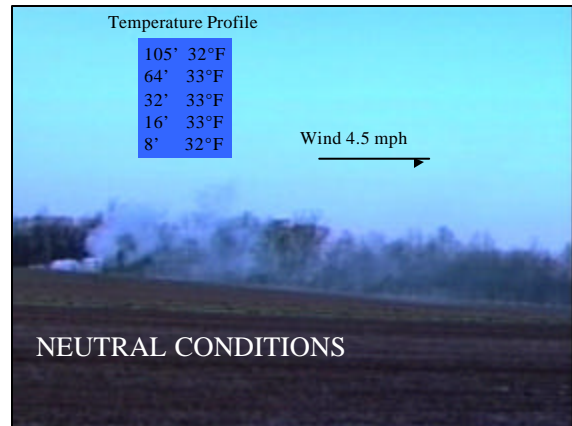
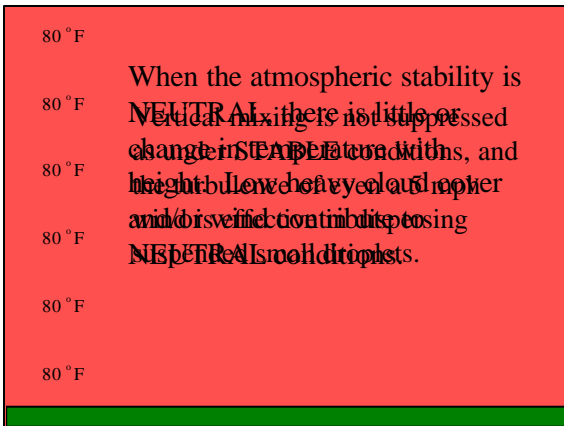
- Increase the amount of spray droplets moving off-site

Surface Inversions can:

- Decrease the dispersion of droplets too small to quickly settle out.
- Result in a higher air concentration of these small droplets.
- Increase the potential for off-target effects.
- Increase the distance at which off-target effects can be observed.
- Increase the size of the area affected.
- Cause the direction of drift to be unpredictable

Reducing the effects of Surface Inversions on Spray Drift

- Minimizing production of very small drops
- Using equipment that minimizes the number of small drops suspended in the air
- Morning applications are likely to have shorter exposure to STABLE conditions than evening applications



Neutral conditions can be the best time to spray

- Wind direction if often consistent
- Good dispersion of droplets too small to quickly settle out.

Aloft Inversions

- Are not likely to effect applications to agricultural crops
- Low altitude aloft inversions can affect aerial forestry application
- Low altitude aloft inversions are often surface inversions in the process of dissipating & are therefore short lived



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